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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/616,284	07/08/2003	Michael X. Yang	AMAT/7669.P1/CMP/ECP/RKK	9910
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PATTERSON & SHERIDAN, LLP 3040 POST OAK BOULEVARD, SUITE 1500 HOUSTON, TX 77056			EXAMINER ZHENG, LOIS L	
			ART UNIT 1742	PAPER NUMBER
DATE MAILED: 03/07/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/616,284

Applicant(s)

YANG ET AL.

Examiner

Lois Zheng

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 December 2005.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-25 and 29-32 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-25 and 29-32 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2/16/06, 2/8/06, 2/8/06, 11/3/05, 10/14/05  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Status of Claims***

1. Claims 13 and 25 are amended in view of the amendment filed 12 December 2005. Claims 26-28 are canceled in view of the amendment. Therefore, claims 1-25 and 29-32 remain under examination.

### ***Terminal Disclaimer***

2. The terminal disclaimer filed on 12 December 2005 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of 10/438,624 has been reviewed and is accepted. The terminal disclaimer has been recorded.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-2, 4-6, 8-11, 13-17, 19-25 and 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dordi et al US 6,267,853 B1(Dordi) in view of Sendai et al US 6,558,518 B1(Sendai).

Dordi teaches an electrochemical deposition system comprising a plurality of plating cells(Fig. 3 numeral 240) disposed on a common platform(Fig. 3 numeral 214), a cleaning cell(Fig. 3 numeral 212) positioned on the platform, an annealing chamber(Fig.

3 numeral 211) in communication with the platform and an electrolyte replenishing system(Fig. 3 numeral 220) in communication with the platform.

However, Dordi does not teach the stacked substrate annealing system as claimed.

Sendai discloses an electroplating apparatus comprising vertically stacked heating furnaces(Fig. 26, col. 25 lines 40-61, claim 15).

Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated a stacked substrate system as taught by Sendai into the annealing system of Dordi in order to allowing annealing of multiple substrates at a time as taught by Sendai(claim 15).

Regarding instant claim 1, Dordi in view of Sendai teaches an electrochemical deposition system comprising a loading station(Dordi, Fig. 3 numeral 210) disposed on a mainframe(Dordi, Fig. 3 numeral 214), a plurality of plating cells(Dordi, Fig. 3 numeral 240) disposed on the mainframe, a bevel clean cell(Dordi, Fig. 14) positioned on the mainframe, a stacked substrate annealing chamber(Dordi, Fig. 3 numeral 211, Sendai, Fig. 26) in communication with the mainframe having a substrate heating plate(Dordi, Fig. 8 numeral 904) and a substrate cooling plate(Dordi, Fig. 8 numeral 913) adjacently positioned as claimed.

Regarding instant claim 13, Dordi further teaches that the electrolyte replenishing system containing source tanks store various solutions(col. 21 lines 10-21) and are in fluid communication with the plating cells(col. 21 lines 31-34). In addition, thorough mixing of various chemicals in the electrolyte is taking place in the electrolyte

replenishing system(col. 21 lines 43-45). Therefore, the electrolyte replenishing system as taught by Dordi in view of Sendai meets the limitation of the claimed multi-chemistry fluid delivery system.

Regarding instant claim 2, Dordi further teaches at least one spin rinse dry cell(Fig. 3 numeral 212) between the substrate plating cells and the substrate loading station as claimed.

Regarding instant claims 4 and 16, Dordi further teaches that the electroplating cell comprising a cell bowl(Fig. 6 numeral 430, an overflow weir(Fig. 6 numeral 478), an anode(Fig. 6 numeral 496, Fig. 11 numeral 2004), an ionic membrane(Fig. 6 numeral 494, Fig. 11 numeral 2002) and a diffusion member(Fig. 6 numeral 476) as claimed.

Regarding instant claim 5, Dordi further teaches that the diffusion member is a fluid permeable porous ceramic member(col. 18 lines 54-56).

Regarding instant claims 6 and 17, the ionic membrane of Dordi is a cationic membrane separating the anode and cathode compartment as claimed.

Regarding instant claim 8, Dordi further teaches that the annealing chamber comprises substrate support pins(Fig. 8 numeral 906) connected to a lift plate(Fig. 8 numeral 928) to position the substrate in the annealing chamber(col. 25 lines 37-51). Therefore, the substrate support pins and lift plate setup reads on the substrate transfer robot as claimed.

Regarding instant claims 9 and 21, Dordi further teaches that the bevel clean cell comprises a rotatable vacuum chuck(Fig. 14 numeral 2124, col. 9 lines 29-44), a plurality of substrate centering posts(Fig. 14 numeral 2134) positioned radially outward

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of the vacuum chuck, and a movable fluid dispensing nozzle(Fig. 14 numeral 2150 and 2170) positioned to dispense an etchant solution onto the bevel of a substrate positioned on the vacuum chuck(col. 10 lines 12-14 and 24-27) as claimed.

Regarding instant claims 10 and 22, Dordi further teaches that the centering posts comprise a raised substrate support portion(Fig. 14, numeral 2140). Since the substrate centering posts of Dordi in view of Sendai are located on the peripheral of the workpiece, any one of them read on the claimed eccentrically positioned centering post based on the broadest reasonable interpretation.

Regarding instant claim 11, Dordi teaches different plating solutions can be connected to different plating cells(col. 21 lines 7-45) which meets the limitation of the instant claim.

Regarding instant claim 14, Dordi teaches at least one plating cell as claimed.

Regarding instant claim 15, Dordi further teaches the claimed electroless plating cells(col. 12 lines 21-29) in addition to the electrochemical plating cells.

Regarding instant claim 19, Dordi teaches that the cleaning cell is a spin rinse dry cell(Fig. 3 numeral 212, col. 5 line 24) as claimed.

Regarding instant claim 20, Dordi teaches that the cleaning cell comprises a substrate bevel clean cell(col. 3 lines 55-58, Fig. 14) as claimed.

Regarding instant claim 23, since the centering posts of Dordi is rotated by the rotation assembly(Fig. 14 numeral 2120), the rotation assembly reads on the actuator as claimed.

Regarding instant claim 24, as stated above, Dordi teaches at least one spin rinse dry cell and at least one bevel clean cell as claimed.

Regarding instant claim 25, Dordi further teach a gas distribution nozzle(Dordi, Fig. 8 numeral 936) as claimed.

Regarding instant claim 29, the instant claim is rejected for the same reasons as stated in the rejection of instant claim 1 and 4 above.

Regarding instant claim 30, the instant claim is rejected for the same reason as stated in the rejection of instant claim 24 above.

Regarding instant claim 31, the instant claim is rejected for the same reasons as stated in the rejection of instant claims 29 and 25 above.

Regarding instant claim 32, Dordi teaches an electrolyte return line(Fig. 7 numeral 614) providing electrolyte to the processing cells, the electrolyte return line of the electrolyte replenishing system(i.e. multi-chemistry fluid delivery system) is inherently in fluid communication with the anolyte and the catholyte compartments as claimed.

5. Claims 7, 12 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dordi in view of Sendai, and further in view of Woodruff et al US Patent Application Publication 2001/0032788 A1 (Woodruff).

The teachings of Dordi and Sendai are discussed in paragraph 4 above respectively. However, Dordi in view of Sendai do not explicitly teach separate catholyte and anode inlets to the cathode and anode compartment of the process cell.

Woodruff teaches an electrochemical processing chamber comprising separate anolyte and catholyte fluid flows(page 11 paragraph 88).

Regarding instant claim 7, it would have been obvious to one of ordinary skill in the art to have incorporated the separate anolyte and catholyte fluid flows as taught by Woodruff into the apparatus of Dordi in view of Sendai in order to eliminate the consumption of additives at the anode and the need to replenish the additive as often as taught by Woodruff(page 11, paragraph 88).

Regarding instant claim 12, since Dordi in view of Sendai and Woodruff teach the tanks to store various electrolyte solutions and separate catholyte and anolyte fluid flows, Dordi in view of Sendai and Woodruff inherently teaches the fluid communication between the catholyte tank and the cathode chamber of the plating cells and the fluid communication between the anolyte tank and the anode chamber of the plating cells as claimed.

Regarding instant claim 18, the instant claim is rejected for the same reason as stated in the rejection of instant claims 7 and 12 above.

***Allowable Subject Matter***

6. Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter: The prior art of record does not teach or suggest, either alone or in combination the spin rinse dry cell comprising the claimed structure. More specifically, the prior art

does not teach the claimed annularly and inwardly curing pressure reducing surface and a fluid receiving shield extending radially inward from an upper portion of the cylindrical cell bowl wall.

### ***Response to Arguments***

8. Applicant's arguments filed 12 December 2005 have been fully considered but they are not persuasive.

In the remarks, applicant argues that Dordi, Sendai and Woodruff, alone or in combination, do not teach the claimed invention.

The examiner does not find applicants argument persuasive since Sendai clearly teaches an annealing system with vertically stacked multiple furnaces used in an electrochemical plating system. When incorporated into the teachings of Dordi, Sendai fills the deficiency of Dordi's lacking of teaching of a stacked annealing station. Therefore, Dordi in view of Sendai or Dordi in view of Sendai and Woodruff disclose an electrochemical plating apparatus that meets the structure limitation of the instantly claimed apparatus.

### ***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lois Zheng whose telephone number is (571) 272-1248. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LLZ

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SUPERVISORY PATENT EXAMINER  
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